

Amendments to the Claims

1. (Currently Amended) An isolated and purified bacterial reverse transcriptase (RT) of (SEQ ID NO: 1), ~~or a substantially homologous amino acid sequence with which~~ synthesizes msDNA, and which RT further comprises a sequence of amino acid residues as follows: Tyr-Xaa₆-Asp-Asp (SEQ ID NO: 50), wherein Xaa₆ is alanine or cysteine and further comprises a sequence of amino acid residues as follows: Asn-Xaa₁-Xaa₂, wherein Xaa₁ is a hydrophobic residue selected from the group consisting of alanine, leucine, and phenylalanine, and Xaa₂ is a hydrophobic residue selected from the group consisting of leucine, valine, and isoleucine.

2. (Previously Amended) The bacterial RT of claim 1 which contains a second sequence of amino acid residues as follows: Ser-Xaa₃-Xaa₄-Xaa₅, wherein Xaa₃ is a hydrophobic residue selected from the group consisting of valine, phenylalanine, leucine, and isoleucine, Xaa₄ is a polar residue selected from the group consisting of threonine, asparagine, lysine, and serine, and Xaa₅ is a hydrophobic residue selected from the group consisting of tryptophan, phenylalanine, and alanine, as shown in SEQ ID NO: 51.

3. (Canceled)

4. (Previously Amended) The bacterial RT of claim 2 which contains a fourth sequence of amino acid residues as follows: Xaa₇-Val-Thr-Gly, wherein Xaa₇ is a polar residue selected from the group consisting of arginine, glutamic acid, lysine, valine, and glutamine, as shown in SEQ ID NO: 45.

5. (Previously Amended) The bacterial RT of claim 1 which has the common subdomains 1 through 7 in Figure 14, which sequences are shown in SEQ ID Nos: 32-38.

6. (Currently Amended) The bacterial RT of claim 1 wherein ~~the sequence SEQ~~ ID NO: 50 is located in subdomain 5 shown in Figure 14 at positions 175-191 of SEQ ID NO: 32, at positions 175-191 of SEQ ID NO: 33, at positions 175-191 of SEQ ID NO: 34, at positions 168-184 of SEQ ID NO: 35, at positions 159-175 of SEQ ID NO: 36, at positions 171-187 of SEQ ID NO: 37, and at positions 157-173 of SEQ ID NO: 38.

7. (Currently Amended) An isolated and purified bacterial reverse transcriptase (RT) which synthesizes msDNA and which is essential for the synthesis of msDNA *in vivo*, said RT comprises a sequence of amino acid residues as follows: Tyr- Xaa₆-Asp-Asp, wherein Xaa₆ is alanine or cysteine, as shown in SEQ ID NO: 50, wherein said sequence is located in subdomain 5 shown in Fig. 14 at positions 175-191 of SEQ ID NO: 32, at positions 175-191 of SEQ ID NO: 33, at positions 175-191 of SEQ ID NO: 34, at positions 168-184 of SEQ ID NO: 35, at positions 159-175 of SEQ ID NO: 36, at positions 171-187 of SEQ ID NO: 37, and at positions 157-173 of SEQ ID NO: 38, and further comprising the 61 amino acid residues as shown by black dots in Figure 14 of SEQ ID Nos: 32-38, wherein h is a hydrophobic residue and p is a small polar residue.

8. (Previously Amended) An isolated and purified bacterial RT which comprises an amino acid sequence selected from the sequences SEQ ID Nos: 32-38 shown in Figure 14, which sequences are shown in SEQ ID Nos. 30-36.

9. (Canceled)

10. (Previously Amended) A reverse transcriptase extension *in vitro* screening test method for determining the presence or absence of msDNA in a bacterium comprising:

treating a preparation of total RNA extracted from said bacterium with a reverse transcriptase in the presence of a radiolabeled deoxynucleotide, wherein said RT, when msDNA

is present in the total RNA of the bacterium, utilizes the DNA portion of the msDNA as a primer and the RNA portion of the msDNA as a template for radiolabeling the DNA portion of the msDNA, and wherein said RT comprises a sequence of amino acid residues as follows: Tyr-Xaa₆-Asp-Asp (SEQ ID NO:50) where Xaa₆ is an alanine or cysteine, and a sequence of amino acid residues as follows: Asn-Xaa₁-Xaa₂, wherein Xaa₁ is a hydrophobic residue selected from the group consisting of alanine, leucine, and phenylalanine, and Xaa₂ is a hydrophobic residue selected from the group consisting of leucine, valine, and isoleucine

electrophoresing the treated RNA preparation, and

determining the presence of msDNA in the bacterium by detecting a band of radiolabeled DNA, said band being indicative of the presence of msDNA in the bacterium,

wherein said bacterium is selected from the group of genera consisting of Myxococcus, Proteus, Klebsiella, Flexibacter, Cytophaga, Stigmatella, Salmonella, Nannocystis, Rhizobium, and Bradyrhizobium.

11. (Canceled)

12. (Previously Amended) The isolated and purified RT of claim 4 which RT has in the following order starting from N- to the C-terminus:

(1) an amino acid sequence of Ser-Xaa₃-Xaa₄-Xaa₅- (SEQ ID NO:51), wherein Xaa₃ is a hydrophobic residue selected from the group consisting of valine, phenylalanine, leucine, and isoleucine, Xaa₄ is a polar residue selected from the group consisting of threonine, asparagine, lysine, and serine, and Xaa₅ is a hydrophobic residue selected from the group consisting of tryptophan, phenylalanine, and alanine;

(2) an amino acid sequence of Asn-Xaa₁-Xaa₂, where Xaa₁ is a hydrophobic residue selected from the group consisting of alanine, leucine, and phenylalanine, and Xaa₂ is a hydrophobic residue selected from the group consisting of leucine, valine, and isoleucine;

(3) an amino acid sequence Tyr-Xaa₆-Asp-Asp (SEQ ID NO:50) wherein is a alanine or cysteine; and

(4) an amino acid, Xaa₇, where Xaa₇ is a polar residue selected from the group consisting of arginine, lysine, glutamic acid, glutamine, and valine.

13. (Canceled)

14. (Canceled)

15. (Currently Amended) An isolated and purified reverse transcriptase which is a prokaryotic reverse transcriptase, which comprises a YXDD (tryosine-X-aspartic acid-aspartic acid) box and an amino acid sequence Asn-Xaa₁-Xaa₂, wherein Xaa₁ is a hydrophobic residue selected from the group consisting of alanine, leucine, and phenylalanine, and Xaa₂ is a hydrophobic residue selected from the group consisting of leucine, valine, and isoleucine, and wherein said YXDD box is contained in the group consisting of SEQ ID No. 11-24 and 32-38.

16. (Previously Amended) The reverse transcriptase of claim 15 wherein the X (SEQ ID NO: 50) is alanine or cysteine.

17. (Previously Amended) The isolated and purified bacterial reverse transcriptase (RT) of claim 1 which RT has in the following order starting from N- to the C- terminus, an amino acid sequence of Asn-Xaa₁-Xaa₂, where Xaa₁ is a hydrophobic residue selected from the group consisting of alanine, leucine and phenylalanine and Xaa₂ is a hydrophobic residue selected from the group consisting of leucine, valine and isoleucine, an amino acid sequence of Ser-Xaa₃-Xaa₄-Xaa₅ (SEQ ID_NO:51), wherein Xaa₃ is a hydrophobic residue selected from

the group consisting of valine, phenylalanine, leucine and isoleucine, Xaa₄ is a polar residue selected from the group consisting of threonine, asparagine, lysine and serine, and Xaa₅ is a hydrophobic residue selected from the group consisting of tryptophan, phenylalanine and alanine, an amino acid sequence of Tyr-Xaa₆-Asp-Asp (SEQ ID NO: 50), where Xaa₆ is a alanine or cysteine, an amino acid sequence of Xaa₇-Val-Thr-Gly (SEQ ID. NO: 52), where is a polar residue selected from the group consisting of arginine, lysine, glutamic acid, glutamine and valine.